

ITALIAN MACHINE TOOLS, ROBOTICS & AUTOMATION INDUSTRY ~ NEWS

April 2023

PIATTAFORMA INDIA PROJECT

NEWSLETTER NO. 78



UCIMU-SISTEMI PER PRODURRE



Need Buyer Credit Finance to buy machine?

We can help you!

please write to us – italianmachinery@indiaitaly.com

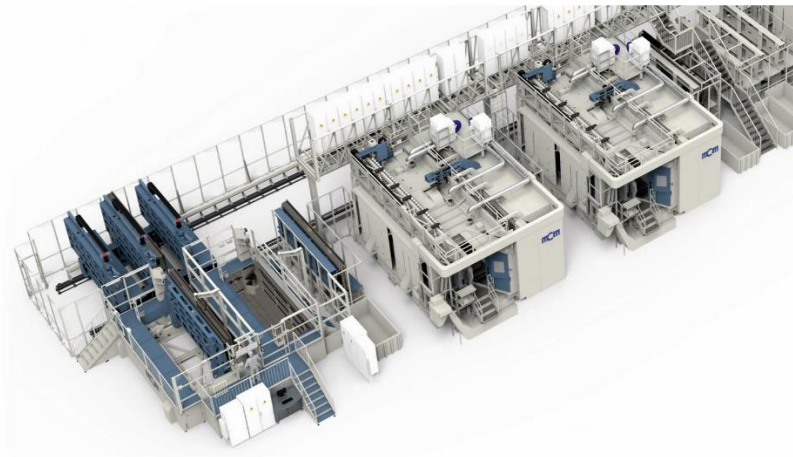
CASE HISTORY MCM - AIRBUS

THE TECHNOLOGICAL CHALLENGE

The goal of the MCM's production system was to considerably increase the automation of the production line for structural titanium components (pylons) destined to A320neo, A330neo and A350neo aircraft. The first technological challenge concerned the need to efficiently produce various titanium components of significant longitudinal dimensions, up to 4,380 mm, and with masses ranging from 164 to 500 kg, as well as the mass of the equipment which can reach 1,800 kg (total weight allowed can exceed 4000 kg). The dimensions and the masses clearly show the technical complexity involved in setting up a Flexible Manufacturing System (FMS) for the management of pallets/parts. Added to this there was a major restriction: the relatively small amount of existing space considering the size that an FMS (six machining centres for particularly large components) would require. For this reason, MCM optimised the area covered by the system in comply of the restrictions imposed by the customer site.

MCM's SOLUTION

MCM helped Airbus to define in a global way every aspect of the new system. In this phase it was necessary to understand the customer's requirements both in terms of layout and productivity, before coming up with concrete technological solutions, with a continuous exchange of information between MCM and AIRBUS. As evidence of this, we can see how the customer's technical specification evolved and was modified in synergy with MCM, especially in terms of material and component.



PRODUCTION SYSTEM

MCM supplied Airbus with a system composed of six JETFIVE machining centres, organised in FMS. The overall dimensions are imposing: over 70 metres long and 16 metres wide, although the space taken up is actually impressively small considering the size of the machinery itself, the pallets, the maintenance systems and the loading/unloading stations. In concrete terms, MCM was able to optimise the system's economic performance for the space it takes up.

The compact layout of the system was, custom-made to adapt to the structural and architectural constraints of the building which would house it.

THE MACHINES: JET FIVE 5000



The JETFIVE model is the ultimate expression of MCM's technological excellence. JETFIVE machining centres are a cost-effective alternative to gantry-type machines (which do not allow the optimal swarf extraction because they work with pallets on the horizontal plane) thanks to their significant size. JETFIVE offer the greatest customisation potential in terms of all technical and dimensional aspects. The six machines for Airbus feature working dimensions of X=5000 mm, Y=1600 mm, Z=1000 mm.

The pallet is kept in the vertical position during machining, the fourth and fifth axis is assigned to a "bi-rotative" head. The A axis can rotate by $\pm 110^\circ$ and the C axis by $\pm 275^\circ$.

Each machine is managed, via NC, two axes for tool change and further three axes for pallets' movement and loading/unloading through FMS transport system.



The removal process of titanium alloys and other materials which are difficult to machine requires significant cutting power as well as an efficient lubri-cooling system for the cutting operations. The electrospindle has a power of 115 kW (NSK-A125 tool attachment), with a maximum speed of 4,000 RPM and maximum torque of 1,750 Nm. The lubri-cooling system circuit has a flow rate of 100 l/min at a maximum pressure of 80 bar, with a 3,500 l tank. The structure provides a high level of rigidity to the machine, offering excellent vibration damping and, thus, guaranteeing speed and precision. The tool magazine is housed in the

upper section of the machine and the tools are loaded via special lifting system from the tool loading/unloading station to the magazine itself. This high level of customisation, coupled with the positioning of the electrical cabinet on the machine's "roof", ensures the floor space is fully optimised.

THE AUTOMATION SYSTEM: FMS

One of the main crucial aspects was the development of an efficient automation system to link the six JETFIVE machines. Optimisation of space was achieved by moving the pallets in vertical position. To facilitate loading/unloading and lock of the workpiece to the pallet, the two loading/unloading stations are equipped with $\pm 90^\circ$ tilting systems able to switch the position of the pallet + workpiece from horizontal to vertical. The supply included 18 pallets which move along 70 m long tracks. The shuttle can transport two pallets simultaneously, and there is a total of 10 vertical pallet storage positions distributed optimally to comply with the layout restrictions. This configuration of the FMS, reduces the space occupied and offers outstanding dynamic capacity, covering the path between the operator station and the furthest machine in a maximum time of eight minutes.

SUPERVISION AND SENSORS

The entire system is supervised by the jFMX software developed by MCE (MCM's IT division) which can manage all the system's resources in real time. The jFMX supervisor allows the system's level of automation to be increased, giving it the ability to operate with the flexibility needed to optimise the resources and production output. The software plays an important role in the application of the principles of Industry 4.0: it is interconnected with the corporate ERP system and, thanks to an extensive network of sensors (accelerometers, flow meters, dynamometers etc.) it is able to accumulate, manage and monitor an enormous quantity of data in real time, which Airbus can use to determine the status of the system and identify the onset of any operational deviations of the machines. Predictive maintenance consists precisely in the ability of limiting the costs of machine breakdown and rejected parts before they are generated. The goal is to intervene before the operational quality of the production system declines to the point where the manufactured parts are, for example, out of tolerance. This would represent a major diseconomy for components of such significant added value as those in question. For this reason, MCM performed the optimisation of the sensors system in order to obtain all necessary data.

<https://www.mcmspa.it/?!Site=en>

The project Piattaforma India has been promoted by UCIMU – Association of Italian Machine Tools Manufacturers and AMAPLAST – Italian Plastics and Rubber Processing Machinery and Moulds Manufacturers Association. The two associations agreed on the idea that promoting a network of associations and entrepreneurs who have developed knowledge and experience on the Indian market, can be useful in favoring of new paths of development for business. The Indian companies who are interested to form JV, cooperation, technical tie up, purchase machinery etc from/with Italian companies can contact below mentioned address for any assistance:

Contact information of Piattaforma India desk:

Mr. Nilesh Joshi
Manager - Italian Machinery Desk in India



C/o The Indo Italian Chamber of Commerce and Industry
11th Floor, Tower - A, Urmi Estate 95, Ganpatrao Kadam Marg,
Lower Parel (W), Mumbai 400013, Maharashtra
P: +91 22 67728186
Mob : +91 7666795385
Fax : +91 22 67728191
Email : italianmachinery@indiaitaly.com